

Syllabus
Introduction to Remote Sensing
Geography 3110 – Fall 2023

Instructor: Tim Edgar, M.S., Associate Professor (Lecturer)
Contact Information: tim.edgar@geog.utah.edu, GC 4842
Office Hours: Mondays & Wednesdays 10:00 AM - 11:00 AM,
Thursday 12:30 PM – 1:30 PM, or by appointment

Lecture: Mondays & Wednesdays, 3:00 PM-4:20 PM, GC 3153
Lab: Select Mondays & Wednesdays during the semester in GC 1855
Prerequisite: None
Course Fulfills: Sustainability (SUST) requirements

Credit Hours

GEOG 3110 is a three credit hour course. At the University of Utah it is assumed that there is at least one hour in class and two hours outside of class per week or the equivalent combination connected to every credit hour.

Course Description

Over the past decade there has been an extraordinary increase in the availability of remotely sensed images of Earth. Many people are now familiar with remotely sensed data through programs like Google Earth. The explosion in the availability of remote sensing data has coincided with a growing number of remote sensing applications. Remote sensing data are now used in anthropology, civil engineering, environmental sciences, geography, geology, hydrology, natural resource assessment, meteorology, and urban planning. This course adopts an interdisciplinary approach applicable to those fields, examining remote sensing theory, techniques, and applications. The course explores the physical basis for remote sensing and covers remote sensing technologies that use sunlight, infrared radiation, radar, and lasers. Five lab exercises give hands-on experience with real remote sensing data.

Learning Outcomes

- Identify and describe the components of a remote sensing system, including principals of electromagnetic radiation.
- Interpret common visual themes in remotely sensed imagery, and associate these themes with remote sensing concepts.
- Summarize interactions between electromagnetic radiation and matter that govern remote sensing within different wavelength regions.
- Demonstrate effective use of remote sensing software, including the ability to solve common analysis problems.
- Explain uses of remote sensing for multiple application areas.

Optional Textbook

All of the content needed to succeed in this course is provided in lecture and labs. Students who benefit from having a textbook to accompany lecture and lab materials may wish to use one of the following texts. Lectures and labs will not directly follow the organization of these texts, and

will include material that goes beyond what is provided in these texts. You are responsible for the material presented in lecture and labs, regardless of whether you choose to use a textbook or not.

1. *Remote Sensing of the Environment: An Earth Resource Perspective, 2nd edition*, John R. Jensen (2007) Prentice Hall, ISBN 9780131889507.

Jensen is an older text, but the class more closely follows the organization of this text. Chapters corresponding to lectures are listed in the course schedule.

2. *Fundamentals of Satellite Remote Sensing: An Environmental Approach, Second Edition*, Emilio Chuvieco (2016) CRC Press, ISBN 9781498728058

Chuvieco is a more recent text, and contains a much better perspective on the current state of remote sensing.

Course Fee

There is a \$25 course fee associated with this class. This fee covers part of the licensing cost for remote sensing software.

Important dates

Last day to add, drop (delete), elect CR/NC, or audit classes

Friday, 25 August

Last day to withdraw from classes

Friday, 15 September

Evaluation

The following weights will be assigned to labs and exams to determine grades for the course:

Percentage Points:

Lab Assignments	35 %
Midterm 1	18 %
Midterm 2	20 %
Final	27 %
Total	100 %

Grade Scale:

A	93-100%
A-	90-93%
B+	87-90%
B	83-87%
B-	80-83%
C+	77-80%
C	73-77%
C-	70-73%
D+	67-70%
D	63-67%
D-	60-63%
E	<60%

Table of Grades

Grades	Points	Explanation
A	(4.0 points)	Excellent performance, superior achievement
A-	(3.7 points)	
B+	(3.3 points)	Good performance, substantial achievement
B	(3.0 points)	
B-	(2.7 points)	
C+	(2.3 points)	Standard performance and achievement
C	(2.0 points)	
C-	(1.7 points)	
D+	(1.3 points)	Substandard performance, marginal achievement
D	(1.0 points)	
D-	(0.7 points)	
E	(0.0 points)	Unsatisfactory performance and achievement

Labs

There will be five labs held in GC 1855 on dates specified in the course schedule below. You are expected to do your own work on the labs. Labs are to be submitted to Canvas by 2:45 PM on their due date. Labs are expected to be well formatted and free of spelling and grammatical errors. Poorly formatted assignments will not be scored; assignments will lose points for poor spelling and/or grammar. Labs turned in late (after 2:45 PM) will lose 10% of their value each day they are late.

Exams

There are three exams in this course, consisting of two midterms and a final. Exams include multiple choice, fill in the blank, and short answer questions. The final exam is cumulative. Exams cannot be made up unless the instructor is contacted prior to an absence. If a make-up exam is offered, it may take any form, at the discretion of the instructor. Make-up exams will be taken at Exam Services in the Marriott Library. A fee is charged by Exam Services for administration of exams.

The final exam will be held on Wednesday, 13 December from 3:30 PM-5:30 PM. Early final exams will not be given.

Extra Credit

There are NO extra credit opportunities in this course.

Academic Misconduct Statement

As stated in the [Student Code](#); “Academic misconduct’ includes, but is not limited to, cheating, misrepresenting one’s work, inappropriately collaborating, plagiarism, and fabrication or falsification of information, as defined further below. It also includes facilitating academic misconduct by intentionally helping or attempting to help another to commit an act of academic misconduct.”

- “‘Cheating’ involves the unauthorized possession or use of information, materials, notes, study aids, or other devices in any academic exercise, or the unauthorized communication with another person during such an exercise.”
- “‘Misrepresenting one’s work includes, but is not limited to, representing material prepared by another as one’s own work, or submitting the same work in more than one course without prior permission of both faculty members.”
- “‘Plagiarism’ means the intentional unacknowledged use or incorporation of any other person’s work in, or as a basis for, one’s own work offered for academic consideration or credit or for public presentation. Plagiarism includes, but is not limited to, representing as one’s own, without attribution, any other individual’s words, phrasing, ideas, sequence of ideas, information or any other mode or content of expression.”
- “‘Fabrication’ or ‘falsification’ includes reporting experiments or measurements or statistical analyses never performed; manipulating or altering data or other manifestations of research to achieve a desired result; falsifying or misrepresenting background information, credentials or other academically relevant information; or selective reporting, including the deliberate suppression of conflicting or unwanted data. It does not include honest error or honest differences in interpretations or judgments of data and/or results.”

This course has a zero-tolerance policy for academic misconduct. For any coursework in which it is demonstrated that a student engaged in academic misconduct the resulting academic sanction will be a score of zero for the coursework. Additionally, the student will be required to meet with the academic advisor from the Department of Geography and/or your respective department, and a [Public Incident Report](#) detailing the instance of academic misconduct will be submitted to the university. See the Student Code for additional information on academic sanctions.

Course Schedule

Date	Topics	Jensen Chapter
Mon 21 Aug	Course Introduction	
Wed 23 Aug	Remote Sensing System	1
Mon 28 Aug	History of Remote Sensing	3
Wed 30 Aug	Remote Sensing and the Electromagnetic Spectrum	2
Mon 4 Sep	Labor Day Holiday (No Class)	
Wed 6 Sep	Remote Sensing and the Electromagnetic Spectrum	
Mon 11 Sep	Aerial Imagery	4
Wed 13 Sep	Image Interpretation	5
Mon 18 Sep	Image Interpretation and Photogrammetry	6
Wed 20 Sep	Lab 1 (GC 1855)	
Mon 25 Sep	Photogrammetry	
Wed 27 Sep	MIDTERM 1, Lab 1 Due	
Mon 2 Oct	Multispectral Remote Sensing	7
Wed 4 Oct	Multispectral Remote Sensing	
Mon 9 Oct	Fall Break (No Class)	
Wed 11 Oct	Fall Break (No Class)	
Mon 16 Oct	Lab 2 (GC 1855)	8
Wed 18 Oct	Thermal Remote Sensing	
Mon 23 Oct	Thermal/Passive Microwave Remote Sensing, Lab 2 Due	9 (Pg. 330-332)
Wed 25 Oct	Lab 3 (GC 1855)	
Mon 30 Oct	Active Microwave Remote Sensing	9 (Pg. 291-330)
Wed 1 Nov	Active Microwave Remote Sensing, Lab 3 Due	
Mon 6 Nov	Active Microwave Remote Sensing	
Wed 8 Nov	MIDTERM 2	
Mon 13 Nov	Lidar	10
Wed 15 Nov	Lab 4 (GC 1855)	
Mon 20 Nov	Remote Sensing of Vegetation	11
Wed 22 Nov	Remote Sensing of Vegetation, Lab 4 Due	
Mon 27 Nov	Remote Sensing of Water	12
Wed 29 Nov	Lab 5 (GC 1855)	
Mon 4 Dec	Remote Sensing of Soils & Arid Landscapes	14
Wed 6 Dec	Remote Sensing of Urban Landscapes, Lab 5 Due	13
Wed 13 Dec	Final, 3:30 PM-5:30 PM, GC 3153	

Disabilities Statement

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the [Center for Disability & Access](#), 162 Olpin Union Building, 581-5020 (V/TDD). CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Safety & Wellness

Your safety is our top priority. In an emergency, dial 911. Report any crimes or suspicious people to 801-585-2677; this number will get you to a dispatch officer at the University of Utah [Department of Public Safety](#) (DPS). If at any time, you would like to be escorted by a security officer to or from areas on campus, DPS will help – just give a call. For more information regarding safety and to view available training resources, including helpful videos, visit [SAFEU](#).

The University of Utah seeks to provide a safe and healthy experience for students, employees, and others who make use of campus facilities. In support of this goal, the University has established confidential resources and support services to assist students who may have been affected by harassment, abusive relationships, or sexual misconduct. A detailed listing of University Resources for campus safety can be found on the Office of the Registrar's [Campus Safety / Responding to Harassment](#) page.

Your well-being is key to your personal safety. If you are in crisis, call [Community Crisis Intervention & Support Services](#) at 801-587-3000; help is close.

The university has additional excellent resources to promote emotional and physical wellness, including the [Counseling Center](#), the [Center for Campus Wellness](#), and the [Women's Resource Center](#). Counselors and advocates in these centers can help guide you to other resources to address a range of issues, including substance abuse and addiction.

Note: The syllabus is not a binding legal contract. It may be modified by the instructor when the student is given reasonable notice of the modification, particularly when the modification is done to rectify an error that would disadvantage the student.

GEOG 3110 Emergency Assembly Points

